Graduate Group in Epidemiology and Biostatistics

Nutritional Epidemiology

EPID 7012

Spring 2026

1. Course Description

This course introduces students to key concepts and methods in Nutritional Epidemiology to equip them with the tools needed to design, analyze, and critically evaluate population-based nutrition research. The course also reviews several specific diet/disease relationships, integrating information from secular trends, cohort studies, clinical trials, and animal experiments. Knowledge in nutrition is useful but not required. Prerequisites include introductory epidemiology.

2. Course Learning Objectives

After completing this course, students will be able to:

- Describe the strengths and limitations of different epidemiological study designs for research in nutritional epidemiology;
- Discuss in detail the strengths and limitations of different nutritional assessment methods for population health research;
- Describe the current state of epidemiological evidence for relationships of diet to the development of selected diseases;
- Identify sources of bias in nutritional data and ways to address them;
- Critically interpret and critique nutritional epidemiologic literature;
- Formulate study designs to assess the nutritional status of a study population.

3. General Course Information

Co-Directors: Stefanie N. Hinkle, PhD (Stefanie.Hinkle@pennmedicine.upenn.edu)
Sunni L. Mumford, PhD (Sunni.Mumford@pennmedicine.upenn.edu)
Location: 3600 CCB 04-304
Credits: 1.0 course unit
Prerequisites: EPID 7010, EPID 5100, PUBH502, or equivalent; permission of course director.

4. Course Format

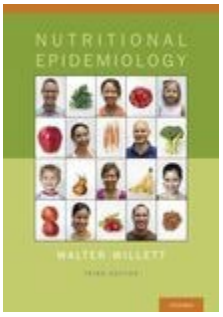
This seminar format class will take place in person once a week for 3 hours for a total of 15 weeks. The class is scheduled on Mondays from 1:45 to 4:45 pm. Students are expected to attend all class sessions and actively participate. Class periods will include lectures, journal clubs, and small group discussions.

5. Course Competencies

The course emphasizes the following core competencies: knowledge within nutritional epidemiology; research skills (study planning, data interpretation, reading and understanding published research); quantitative and computational methodologies (data analysis overview and interpretation of output); communication (writing and presentation skills).

Materials

- Willett W. Nutritional epidemiology. Oxford university press; 2012 Nov 7.



Nutritional Epidemiology (3rd edn)
The digital version of the book is available through the library at this link:
https://doi.org/10.1093/acprof:oso/9780199754038.001.0001

- Selected required readings are provided in the Files folder on Canvas, in the subfolder for each class session.

6. Scientific Rigor and Reproducibility

Through in-depth reading and evaluation of research literature, course discussions, and assessment work this course will provide instruction on rigorous experimental design and data interpretation.

7. Assessments

- Dietary Assessment Report (12%): Students will self-complete a food frequency questionnaire, a 24-hour dietary recall, and a food diary. Following the completion of each of these dietary assessments, students will complete a 1000-1200 word report discussing: 1) their experiences with each assessment; 2) pros and cons of each method including the reproducibility and validity; 3) critique the dietary assessment methods of 3 papers published in a peer-reviewed journal that use an FFQ and/or 24 hour recall (at least one paper for each), discussing the implications of using the chosen method, and whether another method would have been more appropriate. Students will review and provide feedback on their peers' written reports. The actual completed FFQ, 24-hour recall, and dietary records do not need to be submitted.

- Presentation on the Development and State of the Research of an Assigned Dietary Pattern (12%): Students will prepare and deliver a 10–12 minute in-person presentation summarizing the development and current state of the scientific evidence for an assigned dietary pattern. Presentations should address the historical context and evolution of the dietary pattern, how the pattern is defined and operationalized in research (including common dietary assessment approaches and scoring methods, when applicable), the current state of evidence linking the dietary pattern to health outcomes (with attention to study design, strengths, and limitations of the literature), and existing recommendations or guidance from advisory or professional organizations, if any. Topics will be assigned by the course director in advance, and presentations should emphasize critical evaluation of the evidence rather than descriptive summary.

- Research Paper, Presentation and Lay Article on a Controversial Topic in Nutrition (40%): Students will complete a semester-long project focused on a controversial topic in nutrition, designed to develop skills in critical evaluation of the scientific literature and translation of nutrition science for non-expert audiences. Students will prepare a research paper (1000-1200 words) that synthesizes

multiple (at least 4) primary research articles representing opposing sides of the debate and critically evaluates study design, populations, dietary assessment methods, sources of bias and confounding, generalizability, and biological plausibility of findings. In addition, students will write a ~500-word lay article or blog post on the same topic, aimed at a general audience, that accurately reflects the science, avoids jargon, and clearly communicates uncertainty and controversy. The project will be scaffolded throughout the semester and will include topic selection, annotated literature review, evaluation of biological mechanisms, and peer review of lay writing. Students will also prepare and deliver a 9–10 minute oral presentation summarizing the controversy, key evidence, methodological challenges, and implications for research or public health. The research paper is worth 15%, the lay article is worth 15%, and the presentation is worth 10%. Topic options are provided by professors.

- Journal Club (10%): Students will prepare and lead a journal club discussion based on a pre-approved primary research article and an accompanying lay or media article covering the same study or topic. Students are responsible for summarizing the study's research question, design, population, exposure and outcome assessment, key findings, and stated conclusions, as well as critically evaluating sources of bias, confounding, and limitations. In addition, students will assess how the study is represented in the lay article, including accuracy of interpretation, communication of uncertainty, framing of results, and potential overstatement or misrepresentation of findings. Students will lead a structured class discussion that encourages critical engagement with both the scientific evidence and its translation for a general audience.

- Mid-term Exam (26%): The exam will assess the first half of the semester course material. Assessments will include short answer questions on covered topics and data interpretation.

8. Inclusive Environment

In our Nutrition Epidemiology course, we prioritize creating an inclusive and supportive environment that welcomes students of all backgrounds. Diversity, inclusion, and belonging are at the heart of our course values. We believe that every participant, regardless of their race, ethnicity, gender identity, sexuality, religious beliefs, physical or mental health status, or socioeconomic status, deserves to be treated with respect and consideration.

We expect all students to engage in respectful communication, actively listen to diverse perspectives, and refrain from any demeaning, discriminatory, or harassing behavior. Our commitment is to ensure that lectures, office hours, and group sessions are safe and welcoming spaces for everyone. This approach is essential for fostering a learning environment where every student feels valued and can thrive both academically and personally.

9. Office hours

We are available immediately before and after class and are also available by appointment. If you have any questions or problems, it is important to see us as soon as possible so we can appropriately address the situation.

10. Resources

It is important to us that you have the resources you need to be able to focus on learning in this course – this includes both the necessary academic materials as well as taking care of your day-to-day needs. Students who are struggling to afford sufficient food to eat every day and/or lack a safe and suitable space to live should contact Student Intervention Services (vpul-sisteam@pobox.upenn.edu). Students may also wish to contact their Financial Aid Counselor or Academic Advisor about these concerns. You are welcome to notify us if any of these challenges are affecting your success in this course, as long as you are comfortable doing so – we may have resources to support you.

11. Mental health and wellness

Your mental health and wellness are of utmost importance to the course instruction staff, if not the University as a whole. All members of the instruction staff will be happy to chat or just to listen if you need someone to talk to, even if it's not specifically about this course.

Penn also has a Counseling and Psychological Services program which offers free confidential help to students. Here is the link: http://www.vpul.upenn.edu/caps/ If you or someone you know is in distress and urgently needs to speak with someone, please do not hesitate to contact CAPS: 215-898-7021; 3624 Market St. If you are uncomfortable reaching out to CAPS, any member of the instruction staff will be happy to contact them on your behalf.

12. Artificial intelligence

Within this class, you are welcome to use foundation models (like ChatGPT) for most assignments. However, you should note that all large language models still have a tendency to make up incorrect facts and fake citations. You will be responsible for any inaccurate, biased, offensive, or otherwise unethical content you submit regardless of whether it originally comes from you or a foundation model. If you use a foundation model, its contribution must be acknowledged. The university's policy on plagiarism still applies to any uncited or improperly cited use of work by other human beings, or submission of work by other human beings as your own. Foundation models may not be used for the mid-term exam.

13. Attendance

Attendance at lectures is highly encouraged. A major part of the work of this course includes the in-person journal clubs. However, if you are feeling at all sick or displaying any COVID-19 related or flu-like symptoms, please be considerate of your classmates and stay home. Students who cannot attend in-person lectures can view the recorded lectures afterwards. Slides will be posted before each session. Please make a serious effort to be in person when we have guest lectures.

14. Class Schedule

Week 1	14-Jan-26 (Wed)	Overview of Nutritional Epidemiology Dietary assessments part 1 (Food Records, 24-hour Dietary Recall)
Week 2	26-Jan-26	Dietary assessments part 2 (Food Frequency Questionnaires, Supplements)
Week 3	2-Feb-26	Assessment of Nutrients and Variability in Self-Reported Diet Biomarkers
Week 4	9-Feb-26	Measurement Error
Week 5	16-Feb-26	Dietary patterns Student presentations on dietary pattern
Week 6	23-Feb-26	Total Energy Intake
Week 7	2-Mar-26	Target Trials in Nutritional Epidemiology
Week 8	9-Mar-26	Spring Break
Week 9	16-Mar-26	Mid-Term
Week 10	23-Mar-26	Individual and Population Level Nutritional Monitoring and Surveillance, Dietary Guidelines for Americans
Week 11	30-Mar-26	Beverages & Processed Foods
Week 12	6-Apr-26	Food & Nutrition Security
Week 13	13-Apr-26	Physical Activity
Week 14	20-Apr-26	Sleep
Week 15	27-Apr-26	Health Policy Student presentations